Abstracts

Single-crystal dielectric resonators for low-temperature electronics applications

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Computed properties of high-Q factor sapphire, YAG, SrLaAlO/sub 4/, LaAlO/sub 3/, rutile, and quartz dielectric resonators (DR) operating on whispering-gallery TE/sub 011/ and TE/sub 0.1/spl delta// modes are presented in this paper. Resonators with a superconducting metal or partly superconducting partly metal shield are considered. For whispering-gallery-mode resonators, dielectric losses determine the upper limit for their Q factors, while for TE/sub 011/-mode resonators, their Q factors are usually limited by conductor losses. Single-crystal TE/sub 0.1/spl delta//-mode resonators would have Q factors determined by both dielectric and conductor losses, and dominant loss mechanism depends on crystal losses and shield geometry. Geometric factors that allow evaluation of conductor losses of TE/sub 011/- and TE/sub 0.1/spl delta//-mode resonators are given for different DR structures.

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